

MONOPOLE TIP FOR ABLATION CATHETER AND METHODS FOR USING SAME

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[0001] This application is a Continuation of U.S. Patent Application Serial No.: 09/321,666, filed May 28, 1999, ^{now US Patent No. 6,277,113} which is incorporated herein by reference, in its entirety.

BACKGROUND OF THE INVENTION

1. Field of Invention

[0002] The present invention relates generally to ablation catheter systems that use electromagnetic energy in the microwave frequency range to ablate internal bodily tissues. More particularly, the present invention relates to a monopole tip for a catheter that enables distal fire capabilities while enabling a relatively even electromagnetic field to be created at the sides of the monopole tip to facilitate the ablation of cardiac tissue.

2. Description of the Related Art

[0003] Catheter ablation is a therapy that is becoming more widely used for the treatment of medical problems such as cardiac arrhythmias, cardiac dysrhythmias, and tachycardia. Most presently approved ablation catheter systems utilize radio frequency (RF) energy as the ablating energy source. However, RF energy has several limitations which include the rapid dissipation of energy in surface tissues. This rapid dissipation of energy often results in shallow "burns," as well as a failure to access deeper arrhythmic tissues. As such, catheters which utilize electromagnetic energy in the microwave frequency range as the ablation energy source are currently being developed. Microwave frequency energy has long been recognized as an effective energy source for heating biological tissues and has seen use in such hyperthermia applications as cancer treatment and the preheating of blood prior to infusions. Catheters which utilize microwave energy have been observed to be capable of generating substantially larger lesions than those generated by RF catheters, which greatly simplifies the actual ablation procedures. Some catheter systems which utilize microwave energy are described in the U.S. Patent Numbers 4,641,649 to Walinsky; 5,246,438 to Langberg; 5,405,346 to Grundy, et al.; and 5,314,466 to Stern, et al., each of which is incorporated herein by reference in its entirety.